

**WE CLAIM:**

1. A process for joining an aluminum folded fin assembly to a copper base plate to form a folded fin heat sink assembly, comprising the steps of:
  - (a) placing a sheet or paste of Sn-Zn solder upon said base plate,
  - (b) placing said folded fin assembly on said solder sheet or paste,
  - (c) heating said base plate, said folded fin assembly and said solder to a temperature exceeding the liquidus temperature of said solder and allowing said solder to flow, and
  - (d) cooling said solder to form a soldered joint between said base plate and said folded fin assembly.
2. The process of claim 1 wherein said solder is in the form of a sheet and said process further comprises applying a flux to said base plate and said fins, or to upper and lower surfaces of said sheet between steps (a) and (b).
3. The process of claim 1 wherein said solder is in the form of a paste and said paste includes a flux for said solder.
4. The process of claim 3 wherein said paste is stencilled or screen printed onto said base plate.
5. The process of claim 1 wherein said base plate, said folded fin assembly and said sheet are heated to a temperature of about 220-260 degrees Celsius in step (c).
6. The process of claim 1 wherein said solder comprises about 91% Sn and about 9% Zn.
7. The process of claim 1 wherein said base plate is unplated.
8. The process of claim 1 wherein said base plate is nickel plated.
9. The process of claim 1 wherein said base plate, said folded fin assembly and said sheet or paste are placed in an assembly fixture prior to step (a) and retained therein during said steps (b), (c) and (d).
10. The process of claim 9 wherein step (c) is performed in a reflow oven.

11. The process of claim 9 wherein step (c) is performed in a hot plate soldering station.

12. The process of claim 1 wherein:

    said base plate is placed in a temporary assembly fixture prior to step (a);

    following step (b), individual fins of said heat sink and said copper base plate are laser tack welded together at multiple points;

    said base plate is removed from said temporary assembly fixture; and

    said base plate, said folded fin assembly and said solder are heated in step (c) and cooled in step (d) in a fixtureless manner.

13. The process of claim 12 wherein step (c) is performed in a reflow oven.

14. The process of claim 12 wherein step (c) is performed at a hot plate soldering station.

15. A process for joining a plurality of aluminum folded fin assemblies to a copper base plate to form a folded fin heat sink assembly, comprising the steps of:

- (a) placing a plurality of sheets of Sn-Zn solder upon said base plate, one for each said folded fin assembly,
- (b) placing each said folded fin assembly upon a respective solder sheet,
- (c) heating said base plate, said folded fin assemblies and said sheets to a temperature exceeding the liquidus temperature of said solder and allowing said solder to flow, and
- (d) cooling said solder to form a soldered joint between said base plate and each said folded fin heat sink assembly.

16. The process of claim 15 which further comprises applying a flux to said base plate and said fins, or to upper and lower surfaces of said sheet between steps (a) and (b).

17. A process for joining a plurality of aluminum folded fin assemblies to a copper base plate to form a folded fin heat sink assembly, comprising the steps of:

- (a) placing a paste of Sn-Zn solder upon said base plate,
- (b) placing said folded fin assembly upon said paste,

- (c) heating said base plate, said folded fin assemblies and said paste to a temperature exceeding the liquidus temperature of said solder and allowing said solder to flow, and
- (d) cooling said solder to form a soldered joint between said base plate and each said folded fin heat sink assembly.

18. The process of claim 15 wherein said paste includes a flux for said solder.

19. The process of claim 15 wherein said base plate, said folded fin assemblies and said solder are heated to a temperature of about 220-260 degrees Celsius in step (c).

20. The process of claim 15 wherein said solder comprises about 91% Sn and about 9% Zn.

21. The process of claim 15 wherein said base plate is unplated.

22. The process of claim 15 wherein said base plate is nickel plated.

23. The process of claim 15 wherein said base plate, said folded fin assemblies and said solder are placed in an assembly fixture prior to step (a) and retained therein during said steps (b), (c) and (d).

24. The process of claim 23 wherein step (c) is performed in a reflow oven.

25. The process of claim 23 wherein step (c) is performed at a hot plate soldering station.

26. The process of claim 15 wherein:  
said base plate is placed in a temporary assembly fixture prior to step (a);  
following step (b), individual fins of said folded fin assemblies and said base plate are laser tack welded together at multiple points;  
said base plate is removed from said temporary assembly fixture; and  
said base plate, said folded fin assemblies and said solder are heated in step (c) and cooled in step (d) in a fixtureless manner.

27. The process of claim 26 wherein step (c) is performed in a reflow oven.

28. The process of claim 26 wherein step (c) is performed at a hot plate soldering station.
29. The process of claim 17 wherein said paste includes a flux for said solder.
30. The process of claim 17 wherein said base plate, said folded fin assemblies and said solder are heated to a temperature of about 220-260 degrees Celsius in step (c).
31. The process of claim 17 wherein said solder comprises about 91% Sn and about 9% Zn.
32. The process of claim 17 wherein said base plate is unplated.
33. The process of claim 17 wherein said base plate is nickel plated.
34. The process of claim 17 wherein said base plate, said folded fin assemblies and said solder are placed in an assembly fixture prior to step (a) and retained therein during said steps (b), (c) and (d).
35. The process of claim 34 wherein step (c) is performed in a reflow oven.
36. The process of claim 34 wherein step (c) is performed at a hot plate soldering station.
37. The process of claim 17 wherein:  
said base plate is placed in a temporary assembly fixture prior to step (a);  
following step (b), individual fins of said folded fin assemblies and said base plate are laser tack welded together at multiple points;  
said base plate is removed from said temporary assembly fixture; and  
said base plate, said folded fin assemblies and said solder are heated in step (c) and cooled in step (d) in a fixtureless manner.
38. The process of claim 37 wherein step (c) is performed in a reflow oven.
39. The process of claim 37 wherein step (c) is performed at a hot plate soldering station.

40. A folded fin heat sink assembly comprising one or more aluminum folded fin assemblies, each of which is soldered to a copper base plate by means of an Sn-Zn solder.

41. The folded fin heat sink assembly of claim 40, wherein the solder contains about 91% Sn and about 9% Zn.